REMARKS

This paper responds to the Office Action mailed on August 1, 2006, and the references cited therewith.

Claim 43 is canceled herein. As a result, claims 1-42, 44 and 45 are now pending in this application. However, the Examiner has withdrawn claims 1-39 from consideration in view of the restriction requirement. Thus, claims 40-42, 44 and 45 are under consideration.

Claim 40 has been amended. The phrase "when exposed to light" has been added to the end of claim 40. Support for use of sources of singlet oxygen that do not, by themselves, kill bacteria when exposed to light can be found throughout the specification and claims as originally filed, for example, in the Examples (see, e.g., page 83, lines 6-10).

In addition, Applicant has corrected minor typographical errors in the specification and has requested has provided a substitute specification herewith.

Applicant submits that no new subject matter has been added to the application.

Priority

The Examiner has asserted that the present claims are not entitled to a priority claim to several earlier-filed applications. However, this application also claims priority under 35 U.S.C. 119(e) to U.S. Provisional Application Ser. No. 60/426,242 filed November 14, 2002. Applicants note that the Examiner has not asserted that the priority claim to the Ser. No. 60/426,242 application is defective. Applicants assert, and request acknowledgement, that the claim to U.S. Provisional Application Ser. No. 60/426,242, filed Nov. 14, 2002 is a valid priority claim.

Specification

The Examiner has stated that the previously submitted substitute specification was not entered, allegedly because Applicant has not submitted a marked-up version of the specification with the appropriate markings to show all the changes made.

Applicants are confused by the Examiner's statement that an appropriately marked-up copy of the substitute specification was not submitted because such a marked-up copy is clearly present in PAIR (see the101-page entry dated 5-10-2006, identified as "Applicant

Arguments/Remarks Made in an Amendment"). This marked-up copy of the substitute specification has markings showing all changes made relative to the immediate prior version of the specification of record. Applicants have also filed a clean copy of the substitute specification (see the 101-page entry dated 5-10-2006, identified as "Specification"). Applicants request entry of this previously submitted substitute specification or a more complete explanation of what the Examiner believes should be changed.

§102 Rejection of the Claims

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989). To constitute anticipation, the claimed subject matter must be identically disclosed in the prior art. *In re Arkley*, 172 U.S.P.Q. 524 at 526 (C.C.P.A. 1972). For anticipation, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the art. *Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 18 USPQ2d 101 (Fed. Cir. 1991). To overcome the defense of anticipation, "it is only necessary for the patentee to show some tangible difference between the invention and the prior art." *Del Mar Engineering Lab v. Physio-Tronics, Inc.*, 642 F.2d 1167, 1172, (9th Cir. 1981).

Moreover, an anticipation rejection that is based on inherency must be supported by factual and technical grounds establishing that the inherent feature must flow as a necessary conclusion, not simply a possible conclusion, from the teaching of the cited art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990); *In re Oelrich*, 666 F.2d 578, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

Claim 40 is drawn to a method of generating ozone to inhibit the growth of a bacterium comprising contacting the microbe with (i) an antibody that can bind to the bacterium and (ii) a source of singlet oxygen ($^1O_2$) to thereby generate ozone to inhibit the growth of a bacterium, wherein the source of singlet oxygen is not covalently attached to the antibody and the source of singlet oxygen would not, on its own, inhibit the growth of the bacteria when exposed to light.

Devanathan

Claims 40-43 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Devanathan et al. (*Proc. Nat'l. Acad. Sci. USA*, Vol. 87, pp. 2980-2984, April 1990 (Devanathan)). According to the Examiner, Devanathan discloses the photodynamic killing of bacteria by a combination of light oxygen and absorbing photosensitive dyes. However, the Examiner asserts that the sensitizers of Devanathan are not always toxic and only become toxic when exposed to light.

Devanathan is limited to a teaching that iodination of fluorescein isothiocyanate-conjugated antibodies makes these conjugates toxic when exposed to light. The Devanathan disclosure fails to disclose the following elements of the present claims:

1) A method of generating ozone
2) Bacterial killing by an antibody that is NOT covalently attached to a source of singlet oxygen
3) Bacterial killing by an antibody rather than a photolytic agent
4) Use of a source of singlet oxygen would not, on its own, inhibit the growth of the bacteria when exposed to light.

In contrast, the antibodies of the invention generate ozone and thereby kill bacteria. The source of singlet oxygen does not kill or inhibit the growth of bacteria when exposed to light. Applicants submit that this is a beneficial property not recognized by the prior art -- the invention employs singlet oxygen sources that are not directly phototoxic, and that would not injure healthy mammalian cells and tissues. The relative lack of toxicity of the present singlet oxygen sources also permits these singlet oxygen sources to be used without covalent attachment to the antibody. Accordingly, the present invention is novel and patentably distinct from the Devanathan disclosure.

Applicant respectfully requests withdrawal of this rejection of claims 40-43 under 35 U.S.C. § 102(b) with respect to Devanathan.

Berthiaume

Claims 40-43 and 45 were rejected under 35 U.S.C. § 102(b) for anticipation by Berthiaume et al. (*Biotechnology*, Vol. 12, pp. 703-706, July 1994 (Berthiaume)). According to the Examiner, Berthiaume et al., teach a method of generating a reactive oxygen species to inhibit the growth of a bacterium comprising contacting the bacterium with (i) an antibody or antibody fragment that can bind to the bacterium and (ii) a source of singlet oxygen is a sensitizer molecule, as required by the claims. As admitted by the Examiner, "Berthiaume et al., clearly states that photosensitizers are only toxic upon activation by light" (Office Action at page 8 (Aug. 1, 2006).

Applicant submits that Berthiaume is limited to disclosure of photolysis of bacteria by tin (IV) chlorin e that is covalently bound to monoclonal antibodies. Berthiaume fails to disclose the following elements of the present claims:

1. A method of generating ozone
2. Bacterial killing by an antibody that is NOT covalently attached to a source of singlet oxygen
3. Bacterial killing by an antibody rather than a photolytic agent
4. Use of a source of singlet oxygen would not, on its own, inhibit the growth of the bacteria when exposed to light.

Berthiaume provides no disclosure whatsoever of ozone production. Instead, Berthiaume uses an antibody only as a delivery vehicle. Berthiaume does not disclose or recognize that antibodies produce ozone, or that such antibody-generated ozone can kill bacteria. Instead, Berthiaume attributes the bacterial killing to the tin (IV) chlorin e.

Moreover, Berthiaume is limited to tin (IV) chlorin e,-monoclonal antibody conjugates, and provides no disclosure or teaching of a composition consisting of an antibody with a source of singlet oxygen that is not covalently attached to the antibody.

In addition, Berthiaume does not disclose or teach use of a source of singlet oxygen that does not inhibit the growth of bacteria when exposed to light. As admitted by the Examiner, "Berthiaume et al., clearly states that photosensitizers are only toxic upon activation by light" (Office Action at page 8 (Aug. 1, 2006). In contrast, Applicants disclose that a source of singlet

oxygen ($^1O_2$) can be used that does not kill bacteria when exposed to light (see, e.g., page 83, lines 6-10).

Thus, Berthiaume provides no disclosure or teaching of a method of generating ozone to inhibit the growth of a bacterium comprising contacting the microbe with (i) an antibody that can bind to the bacterium and (ii) a source of singlet oxygen ($^1O_2$) to thereby generate ozone to inhibit the growth of a bacterium, wherein the source of singlet oxygen is not covalently attached to the antibody and the source of singlet oxygen would not, on its own, inhibit the growth of the bacteria when exposed to light.

Applicant respectfully requests withdrawal of this rejection of claims 40-43 and 45 under 35 U.S.C. § 102(b).

Scripps Press Release (Nov. 14, 2002)

Claims 40-42 and 44-47 were rejected under 35 U.S.C. § 102(b) as allegedly anticipated by the Scripps Press Release of November 14, 2002.

Applicant traverses this rejection on the basis that the present invention is entitled to claim benefit of the November 14, 2002 filing date of U.S. Patent Application Ser. No. 60/426,242, filed November 14, 2002, and therefore the Scripps Press Release is not prior art to the present invention.

The Examiner has stated at page 9 of the Office Action that priority has not been granted to US Ser. Nos. 60/315,906, 60/426,242 and PCT/US01/29165. However, no such rejection was made of the priority claim to U.S. Patent Application Ser. No. 60/426,242, filed November 14, 2002. The Examiner's discussion of priority claims in the present Office Action, and the previous Office Action (dated Feb. 7, 2006) properly avoid any criticism of the priority claim made to the 60/426,242 application.

As the provisional application from which the present application derives priority, the 60/426,242 application is in the direct lineage of the present application and has a disclosure that is very closely related to the present application. Applicant therefore respectfully submits that the Examiner's statements with respect to the priority to 60/426,242 application, at page 9 of the August 1, 2006 Office Action, are incorrect.

Applicant further submits that the Scripps Press Release is not prior art to the present application and claims because this Press Release was published on November 14, 2002, which is the date when the priority document, U.S. Patent Application Ser. No. 60/426,242, was filed.

Accordingly, Applicant respectfully submits that this rejection of claims 40-42 and 44-47 under 35 U.S.C. § 102(b) cannot be maintained and requests withdrawal thereof.

§112 Rejection of the Claims

Claims 40-45 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. The Examiner alleges that there is no teaching in the specification of a source of singlet oxygen that is not covalently attached to the antibody.

Applicant submits that support clearly exists for use of sources of singlet oxygen that are not covalently attached to the antibody throughout the application as filed. Thus, for example, Example III and FIG. 14A-D explicitly illustrate use of source of singlet oxygen that is not covalently attached to the antibody (see, e.g., description of "Bactericidal Assays" at page 77, line 27 to page 78, line 5). A portion of this description of the "Bactericidal Assays' is provided below for easy reference.

> In a typical experiment, a culture of *E. coli* (in log phase growth, OD_{600} = 0.2-0.3) was repeatedly pelleted (3 x 3,500 rpm) and resuspended in PBS (pH 7.4). The PBS suspended cells were then added to glass vials and cooled to 4 °C. Hematoporphyrin IX (40 μM) and antibody (20 μM) were added. . . (see page 77, line 28 to page 28, line 2).[1]

The concentrations of antibody (20 μM) and hematoporphyrin (40 μM) are different and separately described, thereby clearly teaching that these two molecules are not conjugated together. Thus, the application as filed clearly discloses and illustrates use of an antibody that is not covalently bound to a source of singlet oxygen to kill bacteria.

Applicant also notes that the the application at page 25, line 4 merely states that "in some embodiments" (*not all*) a sensitizer is conjugated to an antibody. Thus, while the application contemplates use of sensitizers conjugated to antibodies, the present application as filed clearly

[1] This same text can be found in U.S. Patent Application Ser. No. 60/426,242, filed November 14, 2002, which is a provisional application from which the present application claims priority.

provides support for use of a source of singlet oxygen that is *not* covalently attached to the antibody.

Withdrawal of the rejection of claims 40-45 under 35 U.S.C. §112, first paragraph, is respectfully requested.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (516) 795-6820 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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This paper or fee is being filed on the date indicated above using the USPTO's electronic filing system EFS-Web, and is addressed to: MS AF, The Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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